Indian Maritime University

(A Central University, Govt of India)

May-June 2018 End Semester Examinations

B Sc (Nautical Science)

Semester-I

Nautical Physics-I (UG21T2105)

Duration:3 Hrs Max Marks:70 Marks

Date: 12.07.2018 Pass Marks:35 Marks

Note: Answer any SEVEN from the following 9 Questions.
All questions carry equal marks.

(7 ×10 =70)

1. a)A body whose mass is 6 kg is acted upon by a force which changes its velocity from 3 m/s to 5 m/s .find the impulse of the force. If the force is acted for 2 seconds, find the force in newton. (5)

b) Explain the term:

i)Streamline flow ii) turbulent flow (5)

2. a)What is Reynolds number? how is it related with critical velocity. (5)

b)Explain anamolous expansion of water. (5)

3. a)Explain the term "Precession" or gyroscopic motion. (5)

b) What do you understand by capillarity? (5)

4. a)Define mechanical advantage, velocity ratio and efficiency as applied to machines. Derive the relation between them. (5)

b)Why the cargo is kept at the bottom of the ship. (5)

5. a)Define and explain the term viscosity and coefficient of viscosity. (5)

b)State and prove the Bernoulli's equation for the liquid of flow. (5)

6. a)Determine the height to which water will rise in a capillary tube of 0.5×10^{-3} m diameter. Given for water,surface tension is 0.074 N/m. (5)

b) With the help of neat sketch, explain the differential pulley and derive an expression for its efficiency. (5)

7. a)State Pascal's law.Describe one experiment to demonstrate this law. (5)

b)In a steel and axel arrangement, the radius of the wheel is 30 cm and radius of the axel is 2 cm.To overcome a resistance of 30 kg wt,an effort of 5 kg wt has to be applied. Calculate mechanical advantage, velocity ratio and efficiency of arrangement. (5)

8. a)Explain the principle, construction and working of hydraulic brake. (5)

b)Determine the force required to double the length of a steel wire of cross section 0.5 cm^2.Young's modulus of steel is 2×10^{11} N/m^2 (5)

9. a)Define moment of inertia. A thin metal ring of diameter 1 m and mass 2 kg starts from rest and rolls down an inclined plane .its linear velocity on reaching the foot of the plane is 10 m/s.calculate

i)M.I of ring ii)K.E of rotation at that instant. (5)

b)What are the different modes of transmission of heat? (5)
